CERCLA Five-Year Review Program
Corps of Engineers Capabilities and Support

I. Introduction.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP) require periodic reviews of all remedial actions that do not allow unlimited use and unrestricted exposure. The Five-Year Review Program, as described in EPA 540-R-01-007, Comprehensive Five Year Review Guidance addresses these requirements by providing guidelines for evaluating whether the remedial action taken at a particular site remains protective of public health and the environment.

II. Purpose.

During the past few years, a number of hazardous waste sites have transitioned from remedial action into long-term operation and maintenance (O&M). The purpose of this document is to provide a brief description of the Five-Year Review Program and the Corps' capability to conduct these reviews. The Five-Year Review Program is intended to evaluate whether the remedial action taken at a particular site remains protective of public health and the environment.

III. Five-Year Review Procedures.

A. Team Composition. The composition of each Five-Year Review team will vary from site to site and could include Engineers (Geotechnical, Mechanical, Environmental, Chemical, etc.), Scientists (Geologists, Hydrogeologists, Chemists, etc.), or others with unique or specialized skills (Regulatory, Industrial Hygiene, Cost Estimating, etc.). In general, the team will have 2 or 3 technical reviewers, depending on the site's complexity and/or size. Teams should be kept relatively small, so that costs are kept to a minimum. Teams may be made from district personnel, contractors, or a combination of the two if necessary. Each technical member of the review team should have substantial experience in the design and operation of the remedial system(s) under evaluation at the site. The team should have the collective knowledge and ability to quickly assess and provide solutions to any problems existing at the site.

B. Regulatory and Operator Involvement. Early involvement of the RPM, State or Local Regulators, and the Operator of the site in the review process is strongly encouraged. Maintaining a good working relationship with those involved in various aspects of the site will help to produce a comprehensive and well-received review. Although the Five-Year Review report is prepared by the technical review team, the operator and regulators should be invited to participate in the review during the site visit.

C. Review of Existing Data and Documents. Existing site data and documents should be gathered and reviewed early on in the Five-Year Review process. It should be noted

that design documents and O&M data are not always easily obtained prior to the site visit. Effort should be made to obtain and review the following kinds of information prior to conducting interviews and visiting the site.

- ROD, Decision Documents, design analyses (DA), final plans and specifications, as-built drawings, and process flow diagrams.
- Remedial investigation or RCRA facility investigation data (if not summarized in the DA),
- Current monitoring (performance) data (e.g., water levels, contaminant contours, and contaminant levels before and after treatment).
- Operational performance data, for the entire treatment system and each component of that system (examples include, pH measurements before and after an acid-feed system, specific capacity information for extraction wells, or influent and effluent sampling results for an air stripper).
- Current and historical costs for O&M
- Previous performance and/or optimization reports or studies (such as any previous CERCLA Five-Year Review reports, annual reports, modeling studies, etc.)

D. Interviews. An important step in performing Five-Year Reviews is the process of conducting interviews with the Customer, Operator, Regulator, and the local community. Interviews with the Customer and Regulator should provide insight on why a particular alternative was selected, specifically regarding regulations, public comments, technical practicability/feasibility, and cost. Interviews with system operators can provide valuable information on how the treatment system has performed since startup, operational costs, any significant changes in site conditions, or specific performance problem areas. Coordination with the RPM should clarify potential interview candidates and information to be obtained.

E. Site Visit. Five-Year Reviews require a site visit. Only by physically examining the site, can a proper evaluation be made of the system's performance, reliability, and structural integrity. The site may also contain a repository of data, such as influent/effluent (degree of treatment provided) contaminant concentrations. The site visit can also serve to further establish communication links between the team conducting the review, the system operator, and regulatory representatives. A site visit should take no longer than 1 to 2 days. This would include entrance and exit meetings as well as the hands on evaluation of the site. A suggested sequence would be as follows:

- Conduct entrance meeting (introduce team members, discuss objectives, describe site evaluation methods, safety concerns, etc.)
- Conduct preliminary interview of operator(s)
- Conduct site inspection and evaluate treatment data
- Exit meeting (review findings and observations)

Some practical aspects of preparing for and conducting the site visit inspection include some of the following:

- Coordinate site visit date with RPM, Operator, State (if applicable),other interested parties.
- Have adequate tools to do an inspection (tapes, ladders, flags, etc.)
- Operate key equipment to assure functionality
- Use appropriate checklists to make sure everything has been covered
- If possible, to have landfill cover sites mowed prior to inspection
- Look for cost saving measures

F. Data Analysis. Analysis of data gathered during the interviews and site visit or obtained from reports for the site is critical. Often data (operating, ground water chemistry, etc.) about the site is collected, but not evaluated. The analyses to be performed generally fall into the following categories:

1. Closure Objectives. Long-term remediation systems must have clear, realistic objectives and well-defined processes to compare system performance and monitoring data against these objectives. The review process includes understanding the system objectives and evaluating the objectives to assure that they are realistic and still currently applicable. In some cases, decision documents were prepared long ago and issues such as technical impracticability and risk-based clean up may not have been considered. In other cases, clear objectives may not exist, as in situations where previous actions were driven primarily by public or regulatory pressures. The owner/operator must have a plan (an "exit strategy") that defines how the system will be operated until no hazardous substances remain at the site above levels that allow for unrestricted use. The Five-Year review team should verify that there is a program in place to technically evaluate the treatment performance and monitoring data on a continual basis.

2. Performance/Protectiveness. The evaluation of the performance/protectiveness of the remediation system is the primary purpose of the review process. However, the analyses used are site and technology specific. The system should continue to protect the public and the environment by preventing undesirable and unplanned releases or exposures.

3. Maintenance of Equipment. In many cases, the equipment in place at the site is owned by the Government or by an entity other than the operator. It is in the best interest of the Government or the owner to evaluate the degree to which the equipment and facilities are being properly maintained. In some cases, the operator is not given the authority or the funds to perform necessary maintenance. In other cases, the operator may not be aware of the maintenance needs. In any event, the review process provides a mechanism to identify existing or potential maintenance problems for action by both the operator and owner.

G. Report Preparation. A sample report is included in the guidance, along with an outline that may be used to format the report. The level of detail in the report will vary

depending on the nature and complexity of the site. In general, the report should be of sufficient detail so that the site's characteristics, remedial objectives, review findings and recommendations are clearly communicated. Additional information such as field notes, checklists, interviews, figures or tables may be included in the report. Potential changes to the schedule should always be discussed with the customer.

IV. Accomplishments and Results. The Corps of Engineers has conducted several Five-Year Reviews for EPA. To date, over 40 reviews have been completed by various districts with support from the HTRW CX. By using local districts, with capable technical staff, the Corps has provided thorough reviews that meet the budget and scheduling needs of EPA.

V. Capabilities. The Corps has the capability to perform reviews for every Region across the country. Within each district, a dedicated staff with technical experts across a wide range of disciplines are available to perform the work. If a particular district needs specialized technical assistance, the right people can be obtained from other districts to accomplish the work. In addition, the HTRW CX is actively involved with all Five-Year Reviews by providing technical assistance when needed and providing QA for all reports.

VI. Tools. The HTRW-CX has developed a series of checklists that are applicable for Five-Year Reviews. There are 22 checklists which can be found at http://www.environmental.usace.army.mil/library/guide/rsechk/rsechk.html . The checklists remind the user of the data to collect, questions to ask, problems to look for, analyses to perform, and alternative technologies or equipment to consider. They provide references useful in evaluating the process or system and have spaces to record observations in the field. The HTRW CX also has sample reports available, and copies of all applicable EPA Guidance.

VII. Contacts. For additional information regarding Five-Year Reviews, contact either Ric Hines, CENWO-HX-S, 402-697-2624, Eric.D.Hines@nwd02.usace.army.mil , or Greg Mellema, CENWO-HX-G, 402-697-2658, Gregory.J.Mellema@nwd02.usace.army.mil .